Reattachment of octocoral polyps following a stress event and polyp bailout in sea tables in St. John, US Virgin Islands in August of 2019

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Project
» Collaborative Research: Pattern and process in the abundance and recruitment of Caribbean octocorals (Octocoral Community Dynamics)

Contributors	Affiliation	Role
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Abstract
Reattachment of octocoral polyps following a stress event and polyp bailout in St. John, US Virgin Islands. Corals were collected in Round Bay, St. John, U.S. Virgin Islands on 14–15 July, 2019. The date range in this dataset is August 18-26, 2019 during the polyp stress event and reattachment in sea tables. The results publication for this dataset is Wells & Tonra (2021).

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Coverage

Spatial Extent: **Lat**:18.345 **Lon**:-64.681
Temporal Extent: 2019-08-18 - 2019-08-26

Acquisition Description

Methodology:

Fifteen branches of Eunicea flexuosa were collected from an octocoral-dominated reef in Round Bay, St. John, U.S. Virgin Islands on 14–15 July, 2019. Colonies were maintained in a sea table at the Virgin Islands Environmental Resource Station. Due to a sea table malfunction overnight, the water level was reduced, so only the lowest five centimeters of each branch was submerged. The water level was returned

to normal height after at most 8 h. Colonies were visibly stressed and five days after being exposed to air, bailed-out polyps were observed and collected with a 150-μm mesh filter attached to the outflow of the sea table. To determine if these polyps could reattach, 40 bailed-out polyps were placed in a 1-L dish with a stoneware clay tile (14 × 7 × 1 cm). The tile was examined for signs of attachment after 9 days by gently jetting water from a transfer pipette at polyps that appeared to have reattached.

Processing Description

BCO-DMO data manager processing notes:

* Data from file NSF.Polyp_bailout_experiment.xlsx sheet "data" imported into the BCO-DMO data system.
* Converted Date to ISO format yyyy-mm-dd
* Renamed data columns to meet BCO-DMO naming conventions (only [a-zA-Z0-9] and underscores). Periods changed to underscores.

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Related Publications

Wells, C. D., & Tonra, K. J. (2021). Polyp bailout and reattachment of the abundant Caribbean octocoral Eunicea flexuosa. Coral Reefs, 40(1), 27–30. doi:10.1007/s00338-020-02043-0
Results

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Parameters

Parameter	Description	Units
day	numeric day count was made (starting at 0)	per day
date	date of observation in ISO 8601 format yyyy-mm-dd	unitless
number_attached	number of polyps that were attached to the tile	per individual polyp
number_unattached	number of polyps that were not attached to the tile	per individual polyp
total	total number of polyps in the container	per individual polyp

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Project Information

Collaborative Research: Pattern and process in the abundance and recruitment of Caribbean octocorals (Octocoral Community Dynamics)

Coverage: St. John, US Virgin Islands

NSF abstract:
Coral reefs are exposed to a diversity of natural and anthropogenic disturbances, and the consequences for ecosystem degradation have been widely publicized. However, the reported changes have been biased towards fishes and stony corals, and for Caribbean reefs, the most notable example of this bias are octocorals ("soft corals"). Although they are abundant and dominate many Caribbean reefs, they are rarely

included in studies due to the difficulty of both identifying them and in quantifying their abundances. In some places there is compelling evidence that soft corals have increased in abundance, even while stony corals have become less common. This suggests that soft corals are more resilient than stony corals to the wide diversity of disturbances that have been impacting coral corals. The best coral reefs on which to study these changes are those that have been studied for decades and can provide a decadal context to more recent events, and in this regard the reefs of St. John, US Virgin Islands are unique. Stony corals on the reefs have been studied since 1987, and the soft corals from 2014. This provides unrivalled platform to evaluate patterns of octocoral abundance and recruitment; identify the patterns of change that are occurring on these reefs, and identify the processes responsible for the resilience of octocoral populations. The project will extend soft coral monitoring from 4 years to 8 years, and within this framework will examine the roles of baby corals, and their response to seafloor roughness, seawater flow, and seaweed, in determining the success of soft corals. The work will also assess whether the destructive effects of Hurricanes Irma and Maria have modified the pattern of change. In concert with these efforts the project will be closely integrated with local high schools at which the investigators will host marine biology clubs and provide independent study opportunities for their students and teachers. Unique training opportunities will be provided to undergraduate and graduate students, as well as a postdoctoral researcher, all of whom will study and work in St. John, and the investigators will train coral reef researchers to identify the species of soft corals through a hands-on workshop to be conducted in the Florida Keys.

Understanding how changing environmental conditions will affect the community structure of major biomes is the ecological objective defining the 21st century. The holistic effects of these conditions on coral reefs will be studied on shallow reefs within the Virgin Islands National Park in St. John, US Virgin Islands, which is the site of one of the longest-running, long-term studies of coral reef community dynamics in the region. With NSF-LTREB support, the investigators have been studying long-term changes in stony coral communities in this location since 1987, and in 2014 NSF-OCE support was used to build an octocoral "overlay" to this decadal perspective. The present project extends from this unique history, which has been punctuated by the effects of Hurricanes Irma and Maria, to place octocoral synecology in a decadal context, and the investigators exploit a rich suite of legacy data to better understand the present and immediate future of Caribbean coral reefs. This four-year project will advance on two concurrent fronts: first, to extend time-series analyses of octocoral communities from four to eight years to characterize the pattern and pace of change in community structure, and second, to conduct a program of hypothesis-driven experiments focused on octocoral settlement that will uncover the mechanisms allowing octocorals to more effectively colonize substrata than scleractinian corals on present day reefs. Specifically, the investigators will conduct mensurative and manipulative experiments addressing four hypotheses focusing on the roles of: (1) habitat complexity in distinguishing between octocoral and scleractinian recruitment niches, (2) the recruitment niche in mediating post-settlement success, (3) competition in algal turf and macroalgae in determining the success of octocoral and scleractian recruits, and (4) role of octocoral canopies in modulating the flux of particles and larvae to the seafloor beneath. The results of this study will be integrated to evaluate the factors driving higher ecological resilience of octocorals versus scleractinians on present-day Caribbean reefs.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1756381

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